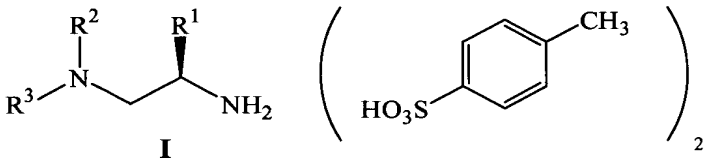
CLAIMS

What is claimed is:

1. A process for preparing a compound of formula I



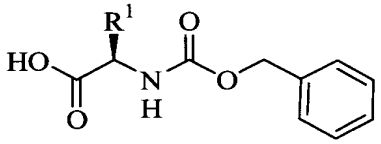
I

wherein:

R^1, R^2, and R^3 are independently, H, C_1-C_6 alkyl, 2-10 membered heteroalkyl, -$(CR^{13}R^{14})_t(C_6$-C_{10} aryl), -$(CR^{13}R^{14})_t(C_3$-C_{10} cycloalkyl), -$(CR^{13}R^{14})(C_6$-C_{10} heterocyclic), wherein t is an integer from 0 to 5; 1 or 2 ring carbon atoms of the cycloalkyl or heterocyclic group are optionally substituted with an oxo (=O) moiety; each R^{13} and R^{14} is independently H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl, and wherein any of R^1, R^2 or R^3 may be optionally substituted with one or more substituents independently selected from halo, -OH, -CN, -SR^{15}, -NO_2, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, 2-10 membered heteroalkyl, -COR^{15} , or $COOR^{15}$ wherein R^{15} is H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl;

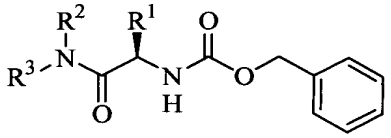
comprising the steps of:

(a) coupling a compound of formula II



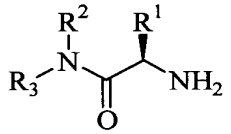
II ;

with an amine $(R^2)(R^3)NH$ to form a compound of formula III



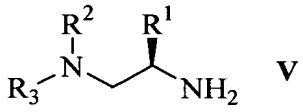
III ;

(b) deprotecting the compound of formula III to form the free amine compound of formula IV



IV ;

(c) reducing the free amine compound of formula IV to form a compound of formula V



V ; and

(d) treating the compound of formula V with *p*-toluenesulfonic acid to form the *bis*-toluenesulfonic acid salt compound of formula I;

wherein steps (b) and (c) can be reversed.

2. The process according to claim 1 wherein R^1, R^2, and R^3 are independently a C_1-C_6 alkyl, -$(CR^{13}R^{14})_t$(C_6-C_{10} aryl), -$(CR^{13}R^{14})$(C_6-C_{10} heterocyclic), unsubstituted or substituted with one or more substituents independently selected from the group consisting of C_1-C_6 alkyl, and -O-alkyl.

3. The process according to claim 2 wherein R^1, R^2, and R^3 are independently a C_1-C_6 alkyl group, unsubstituted or substituted with one or more substituents independently selected from the group consisting of C_1-C_6 alkyl and -O-alkyl

4. The process according to claim 3 wherein R^1, R^2, and R^3 are independently an unsubstituted C_1-C_3 alkyl group.

5. The process according to claim 4 wherein R^1, R^2, and R^3 are each -CH_3.

6. The process according to claim 1, where steps (b) through (d) are carried out without using water as a solvent or an extraction agent.

7. The process according to claim 1, wherein steps (c) and (d) are carried out without using water as a solvent or an extraction agent.

8. The process according to claim 1, wherein step (d) is carried out in the absence of water.

9. The process according to claim 1, where step (b) is carried out in the presence of hydrogen gas, a solvent, and a catalytic amount of metal catalyst, at a temperature from about 0 °C to about 100 °C.

10. The process according to claim 1, wherein step (c) is carried out in the presence of a hydride source and a solvent at a temperature of from about 0 °C to about 100 °C.

11. The process according to claim 10, wherein step (c) is carried out in the presence of lithium aluminum hydride in tetrahydrofuran at a temperature of from about 20 °C to about 70 °C.

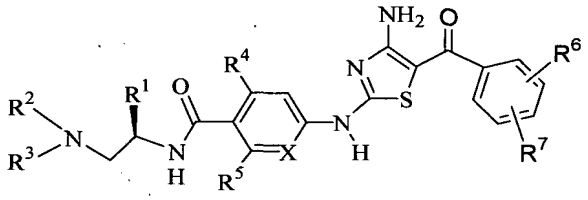
12. The process according to claim 1, wherein step (d) is carried out in the presence of tetrahydrofuran at a temperature from about 0 °C to about 70 °C.

13. The process according to claim 1, wherein step (d) is carried out in the absence of an extraction or chromatography purification of the *bis*-toluenesulfonic acid salt compound of formula I.

14. The process according to claim 1, wherein steps (a) through (d) result in an overall stoichiometric yield of greater than 50% yield of the formula I compound.

15. The process according to claim 1, wherein steps (a) through (d) result in an overall stoichiometric yield of greater than 70% yield of the formula I compound.

16. The process for preparing a compound of formula VI



VI

wherein:

R^1, R^2, and R^3 are independently H, C_1-C_6 alkyl, 2-10 membered heteroalkyl, -$(CR^{13}R^{14})_t$(C_6-C_{10} aryl), -$(CR^{13}R^{14})_t$(C_3-C_{10} cycloalkyl), -$(CR^{13}R^{14})$(C_6-C_{10} heterocyclic), wherein t is an integer from 0 to 5; 1 or 2 ring carbon atoms of the cycloalkyl or heterocyclic group are optionally substituted with an oxo (=O) moiety; each R^{13} and R^{14} is independently H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl, and wherein any of R^1, R^2 or R^3 may be optionally substituted with one or more substituents independently selected from halo, -OH, -CN, -SR^{15}, -NO_2, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, 2-10 membered heteroalkyl, -COR^{15} , or $COOR^{15}$ wherein R^{15} is H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl;

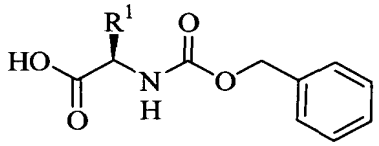
R^4 and R^5 are independently H, halo, C_{1-2} alkyl, -OCH_3, -OH, –NH_2, -$NHCH_3$, -$N(CH_3)_2$, -NO_2, -SH, -SCH_3, -$S(O)CH_3$, -SO_2CH_3,$P(CH_3)_2$, or PO_3H_2;

R^6 and R^7 are independently H, halo, methoxyl, or C_{1-2} alkyl; and

X is -C- or -N-;

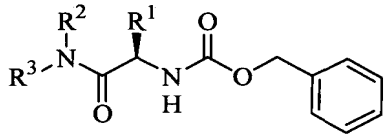
comprising the steps of:

(a) coupling a compound of formula II



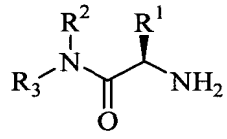
II ;

with an amine $(R^2)(R^3)NH$ to form a compound of formula III



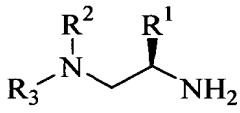
III ;

(b) deprotecting the compound of formula III to form the free amine compound of formula IV



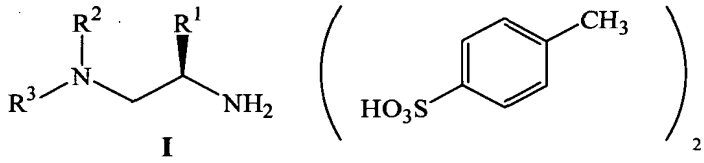
IV ;

(c) reducing the free amine compound of formula IV to form a compound of formula V



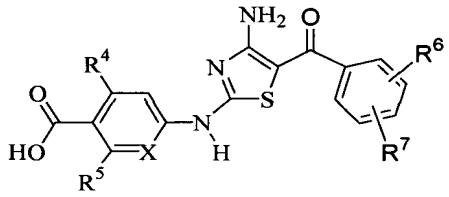
V ;

(d) treating the compound of formula V with *p*-toluenesulfonic acid hydrate to form the *bis*-toluenesulfonic acid salt compound of formula I



I ^{2}; and

(e) coupling the *bis*-toluenesulfonic acid salt compound of formula I with a compound of formula VII



VII

to form the compound of formula VI;

wherein steps (b) and (c) can be reversed.

17. A process according to claim 16 wherein R^1, R^2, and R^3 are independently a C_1-C_6 alkyl, 2-10 membered heteroalkyl, -$(CR^{13}R^{14})_t$(C_6-C_{10} aryl), -$(CR^{13}R^{14})$(C_6-C_{10} heterocyclic), wherein t is an integer from 0 to 5; 1 or 2 ring carbon atoms of the cycloalkyl or heterocyclic group are optionally substituted with an oxo (=O) moiety; each R^{13} and R^{14} is independently H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl, and wherein any of R^1, R^2 or R^3 may be optionally substituted with one or more substituents independently selected from halo, -OH, -CN, -SR^{15}, -NO_2, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, 2-10 membered heteroalkyl, -COR^{15} , or $COOR^{15}$ wherein R^{15} is H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl; R^4 and R^5 are independently H, halo, C_{1-2} alkyl, -OCH_3, -OH, –NH_2, -$NHCH_3$, -$N(CH_3)_2$, -NO_2, -SH, -SCH_3, -$S(O)CH_3$, -SO_2CH_3,$P(CH_3)_2$, or PO_3H_2; R^6 and R^7 are independently H, halo, methoxyl, or C_{1-2} alkyl; and X is -C- or -N-.

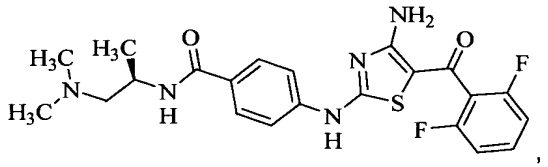
18. The process according to claim 17 wherein R^1, R^2, and R^3 are independently a C_1-C_6 alkyl group, unsubstituted or substituted with one or more substituents independently selected

from the group consisting of C_1-C_3 alkyl and -O-alkyl; R^4 and R^5 are independently H, halo, C_1-C_2 alkyl, $-OCH_3$, -OH; R^6 and R^7 are independently H, halo, methoxyl, or C_1-C_2 alkyl; and X is -C- or -N-.

19. The process according to claim 18 wherein R^1, R^2, and R^3 are independently an unsubstituted C_1-C_3 alkyl group; R^4 and R^5 are independently H, halo, C_1-C_2 alkyl; R^6 and R^7 are independently H, halo, methoxyl, or C_1-C_2 alkyl; and X is -C- or -N-.

20. The process according to claim 19 wherein R^1, R^2, and R^3 are each $-CH_3$; R^4 and R^5 are independently H or C_1-C_2 alkyl; R^6 and R^7 are independently H, halo, or C_1-C_2 alkyl; and X is -C- or -N-.

21. The process according to claim 16 wherein a compound of formula VI is selected from:



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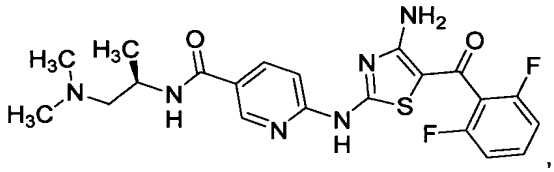

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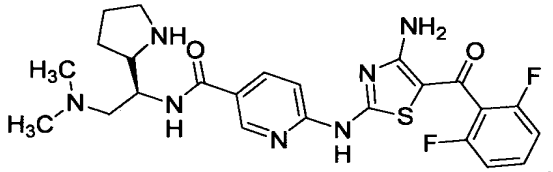

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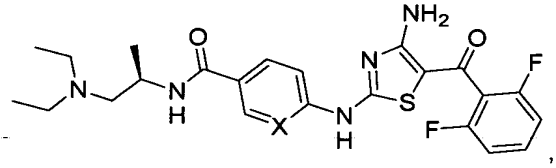

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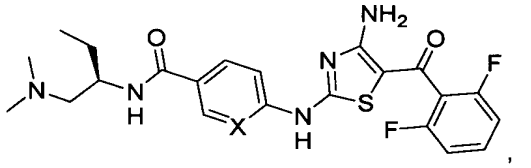

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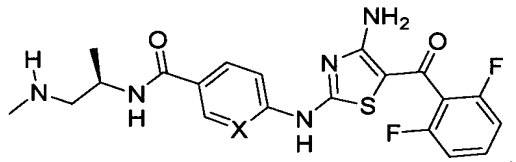

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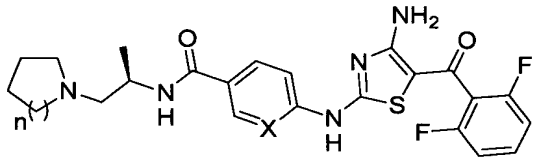
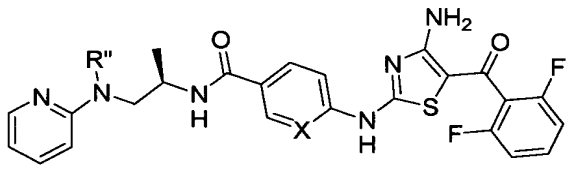


, and



;

wherein n is 1 or 2 and R" is H, -CH_3, or –CH_2CH_3.

22. The process according to claim 16, where steps (b) through (d) are carried out without using water as a solvent or an extraction agent.

23. The process according to claim 16, wherein steps (c) and (d) are carried out without using water as a solvent or an extraction agent.

24. The process according to claim 16, wherein step (d) is carried out in the absence of water.

25. The process according to claim 16, where step (b) is carried out in the presence of hydrogen gas, a solvent, and a catalytic amount of a metal catalyst, at a temperature from about 0 °C to about 100 °C.

26. The process according to claim 16, wherein step (c) is carried out in the presence of a hydride source and a solvent at a temperature of from about 0 °C to about 100 °C.

27. The process according to claim 26, wherein step (c) is carried out in the presence of lithium aluminum hydride in tetrahydrofuran at a temperature of from about 20 °C to about 70 °C.

28. The process according to claim 16, wherein step (d) is carried out in the presence of tetrahydrofuran at a temperature from about 0 °C to about 70 °C.

29. The process according to claim 16, wherein step (d) is carried out in the absence of an extraction or chromatography purification of the *bis*-toluenesulfonic acid salt compound of formula I.

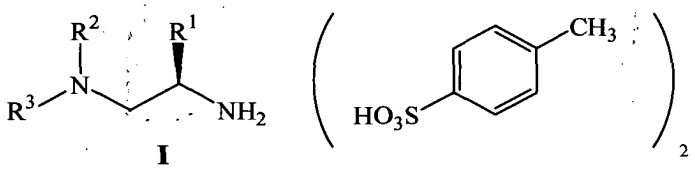
30. The process according to claim 16, wherein step (e) is carried out in the presence of an amide coupling agent, a base, and solvent at a temperature from about 0 °C to about 100 °C.

31. The process according to claim 30, wherein step (e) is carried out in the presence of 4-(4,6-Dimethoxy-1,3,5-triazin-2-yl)-4-methyl-morpholinium chloride, N-methylmorpholine, and DMF at a temperature from about 0 °C to about 100 °C.

32. The process according to claim 16, wherein steps (a) through (e) result in an overall stoichiometric yield of greater than 25% yield of the formula VI compound.

33. The process according to claim 16, wherein steps (a) through (e) result in an overall stoichiometric yield of greater than 45% yield of the formula VI compound.

34. A compound of formula I, comprising



I

wherein:

R^1, R^2, and R^3 are independently, H, C_1-C_6 alkyl, 2-10 membered heteroalkyl, -$(CR^{13}R^{14})_t$(C_6-C_{10} aryl), -$(CR^{13}R^{14})_t$(C_3-C_{10} cycloalkyl), -$(CR^{13}R^{14})$(C_6-C_{10} heterocyclic), wherein t is an integer from 0 to 5; 1 or 2 ring carbon atoms of the cycloalkyl or heterocyclic group are optionally substituted with an oxo (=O) moiety; each R^{13} and R^{14} is independently H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl, and wherein any of R^1, R^2 or R^3 may be optionally substituted with one or more substituents independently selected from halo, -OH, -CN, -SR^{15}, -NO_2, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, 2-10 membered heteroalkyl, -COR^{15} , or $COOR^{15}$ wherein R^{15} is H, C_1-C_6 alkyl, or 2-10 membered heteroalkyl.

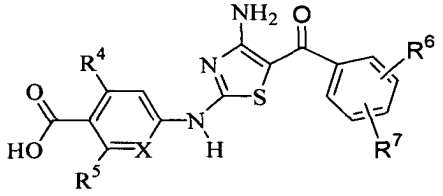
35. The compound according to claim 34 wherein R^1, R^2, and R^3 are independently a C_{1-5} alkyl or monocyclic aryl or heteroaryl group, unsubstituted or substituted with one or more substituents independently selected from the group consisting of alkyl, heteroalkyl, and -O-alkyl.

36. The compound according to claim 35 wherein R^1, R^2, and R^3 are independently a C_1-C_6 alkyl group, unsubstituted or substituted with one or more substituents independently selected from the group consisting of C_1-C_6 alkyl and -O-alkyl.

37. The compound according to claim 36 wherein R^1, R^2, and R^3 are independently an unsubstituted C_1-C_3 alkyl group.

38. The compound according to claim 37 wherein R^1, R^2, and R^3 are each -CH_3.

39. A compound of formula VI, comprising



VII

wherein:

R^4 and R^5 are independently H, halo, C_{1-2} alkyl, $-OCH_3$, -OH, $-NH_2$, $-NHCH_3$, $-N(CH_3)_2$, $-NO_2$, -SH, $-SCH_3$, $-S(O)CH_3$, $-SO_2CH_3$,$P(CH_3)_2$, or PO_3H_2;

R^6 and R^7 are independently H, halo, methoxyl, or C_{1-2} alkyl; and

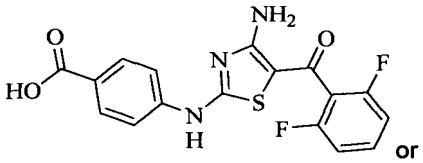
X is -C- or -N-.

40. The compound according to claim 39 wherein R^4 and R^5 are independently H, halo, C_1-C_2 alkyl, $-OCH_3$, -OH; R^6 and R^7 are independently hydrogen, halo, methoxyl, or C_1-C_2 alkyl; and X is -C- or -N-.

41. The compound according to claim 40 wherein R^4 and R^5 are independently H, halo, C_1-C_2 alkyl; R^6 and R^7 are independently H, halo, methoxyl, or C_1-C_2 alkyl; and X is -C- or -N-.

42. The compound according to claim 40 wherein R^4 and R^5 are independently H or C_{1-2} alkyl; R^6 and R^7 are independently H, halo, or C_1-C_2 alkyl; and X is -C- or -N-.

43. The compound according to claim 41 that is



or